

APPENDIX F

GENERAL CLOSURE PLAN

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LIST OF ABBREVIATIONS/ACRONYMS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
ASTM	American Society for Testing and Materials
COPC	contaminant(s) of potential concern
CSU	container storage unit
DOE/NNSA	U.S. Department of Energy, National Nuclear Security Administration
EPA	U.S. Environmental Protection Agency
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
NMED	New Mexico Environment Department
OB	open burning
OD	open detonation
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SW-846	"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"
SWMU	solid waste management unit
SWRC	Solid Waste Regulatory Compliance Group
TA	technical area

APPENDIX F

GENERAL CLOSURE PLAN

This appendix describes general closure activities applicable to all hazardous and/or mixed waste management units at Los Alamos National Laboratory (LANL). The general closure information presented in this appendix addresses final closure of the LANL facility and partial closures of individual hazardous/mixed waste management units. The information provided in this appendix is submitted to address applicable closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC) § 270.14(b)(13), revised June 14, 2000 [6-14-00], and 20.4.1 NMAC, Subpart V, Part 264, Subparts G and H [6-14-00].

This plan includes procedures to document final closure of the LANL hazardous waste management facility. It also includes general discussions of partial closure approaches and procedures for the types of waste management units operating within the LANL facility. Partial closure information and procedures for specific hazardous/mixed waste management units are addressed in individual waste management unit closure plans included with technical area (TA)-specific permit applications, permit modification requests, or permit renewal applications. Further site-specific closure details will be included in required sampling and analysis plans (SAP) to be submitted to the New Mexico Environment Department (NMED) for approval 90 days prior to the initiation of closure activities.

There are multiple types of waste management units at LANL meeting many separate treatment, storage, and disposal requirements both by waste type and different waste management programs. Partial closure of these units will occur separately and over the active life of the LANL facility. All existing units may not be closed before 2100. There is a high potential that decontamination procedures, analytical verification procedures, and the environmental characterization of LANL will change and improve over the life of the facility. Therefore, this closure plan summarizes the general closure activities for the different types of units to be closed and establishes the procedure of submitting separate unit-specific SAPs to the NMED for approval prior to beginning partial closure activities for individual waste management units. The information requirements for the SAPs are included in Section F.2.2.7 of this plan. The SAP will provide the required level of detail to assure closure standards consistent with the appropriate decontamination and verification requirements existing at the time of closure. Closure activities will meet the closure performance standards described in Section F.1.1.

Until final closure is complete and certified in accordance with 20.4.1 NMAC § 264.115 [6-14-00], as discussed in Section F.1.6, a copy of this closure plan and any approved revisions will be on file at LANL's Solid Waste Regulatory Compliance Group (SWRC) and at the U.S. Department of Energy, National Nuclear Security Administration (DOE/NNSA) Los Alamos Site Office (LASO).

F.1 GENERAL CLOSURE INFORMATION

This section is prepared in accordance with the requirements of 20.4.1 NMAC § 270.14(b)(13) and 20.4.1 NMAC, Subpart V, Part 264, Subparts G and H, as applicable.

F.1.1 Closure Performance Standard [20.4.1 NMAC § 264.111]

The hazardous or mixed waste management units addressed in TA-specific permit applications, permit modification requests, or permit renewal applications will be closed to meet the following performance standards:

- Minimize the need for further maintenance
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or atmosphere
- Comply with the applicable closure and post-closure requirements of 20.4.1 NMAC, Subpart V, Part 264, Subparts G and I through DD [6-14-00].

For the majority of the storage and treatment units at LANL, partial closure will be accomplished by removal of waste from the unit(s) and decontamination, if necessary, of the structures, equipment, and areas that have been contaminated by waste materials. These activities will ensure the removal or decontamination of hazardous waste and hazardous waste residues from the unit to established cleanup levels. Land disposal units, tanks, and miscellaneous units that cannot be closed by the removal or decontamination of hazardous waste or hazardous waste residues will be managed under post-closure care requirements contained in 20.4.1 NMAC, Subpart V, Part 264, Subpart G. In the case of land disposal units and tanks or miscellaneous units that are co-located with solid waste management units (SWMU) and that cannot be closed by removal or decontamination of hazardous waste and hazardous waste residues, partial closure will be accomplished by stabilizing, as necessary, the wastes and/or waste residues that remain in place and requesting NMED approval to address such units under alternative requirements, as allowed by

20.4.1 NMAC § 264.110(c), to meet post-closure care requirements, as discussed in Appendix G, the “General Post-Closure Plan.”

F.1.2 Partial and Final Closure Activities [20.4.1 NMAC § 264.112(d)]

Partial Resource Conservation and Recovery Act (RCRA) closure is the closure of a hazardous waste management unit at a facility that contains other active hazardous waste management units. Partial closure at LANL will consist of closing one or more of the hazardous/mixed waste management units at the TAs that operate them, while leaving other active units at the LANL facility in operation. Closure activities for the partial closure of a unit are addressed in Attachment F of TA-specific permit applications, permit modification requests, or permit renewal applications. Partial closure will be deemed complete when the removal or decontamination of hazardous wastes and hazardous waste residues has been verified; the unit is being addressed under alternative requirements to address closure and post-closure care requirements, if appropriate; the closure certification has been submitted to the NMED; and the NMED has approved the closure.

Final RCRA closure of the LANL hazardous waste management facility will occur when all of LANL’s hazardous/mixed waste management units are closed. Final closure will consist of assembling documentation on the closure status of each unit, including all previous partial closures as well as land-based units that have been or are being addressed via alternative closure requirements. Final closure will be deemed complete when the closure certification has been submitted to the NMED and the NMED has approved the final closure.

F.1.3 General Closure Schedule [20.4.1 NMAC §§ 264.112(b)(6), 264.112(e), and 264.113]

Final closure of the LANL facility will occur in the year 2100, but partial closure of any LANL hazardous or mixed waste management unit may occur at any time before then. The following schedule requirements will apply for any LANL closure, partial or final. Written notification will be provided to the NMED 60 days before the start of closure activities at the waste management unit or for the LANL facility final closure review. Written notification will be provided 45 days before the start of partial closure activities for container storage units and tanks, and 60 days before the start of partial closure activities for a landfill unit. However, pursuant to 20.4.1 NMAC § 264.112(e) [6-14-00], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1 NMAC § 264.112(d)(2) [6-14-00]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the

approved closure plan, as required by 20.4.1 NMAC § 264.113(a) [6-14-00], within 90 days after final receipt of waste at the hazardous or mixed waste management unit. This timeframe will be met as long as facilities are available for treatment, storage, or disposal of these wastes. In the event that closure activities cannot begin at a unit within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1 NMAC § 264.113(a) [6-14-00]. Closure activities will be completed in accordance with the requirements of 20.4.1 NMAC § 264.113(b) [6-14-00]. Closure will be conducted in accordance with the schedule(s) presented in Attachment F of TA-specific permit applications, permit modification requests, or permit renewal applications. In the event that closure of a unit is prevented from proceeding according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1 NMAC § 264.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1 NMAC §§ 264.113(a)(1) and (b)(1) [6-14-00] will be made in accordance with 20.4.1 NMAC § 264.113(c) [6-14-00].

F.1.4 Amendment of the General Closure Plan [20.4.1 NMAC § 264.112(c)]

In accordance with 20.4.1 NMAC § 264.112(c) [6-14-00], LANL will submit a written notification of or request for a permit modification to authorize a change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the approved closure plan
- There is a change in the expected year of closure
- Unexpected events occur during closure that require modification of the approved closure plan
- The owner or operator requests the Secretary of the NMED to apply alternative requirements to a regulated unit under 20.4.1 NMAC §§ 264.90(f) and/or 264.110(c).

The written notification or request will include a copy of the amended closure plan for approval by the NMED.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions

presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

F.1.5 Closure Cost Estimate, Financial Assurance, and Liability Requirements [20.4.1 NMAC § 264.140(c)]

In accordance with 20.4.1 NMAC § 264.140(c) [6-14-00], LANL, as a federal facility, is exempt from the requirements of 20.4.1 NMAC, Subpart V, Part 264, Subpart H [6-14-00], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

F.1.6 General Closure Certification [20.4.1 NMAC § 264.115]

Within 60 days after completion of closure of each hazardous waste management unit or final closure of the facility, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the unit or facility has been closed in accordance with the approved closure plan. The certification will be signed by the appropriate DOE/NNSA and LANL officials and by an independent, registered professional engineer, in accordance with 20.4.1 NMAC § 264.115. Documentation supporting the independent, registered engineer's certification will be furnished to the Secretary of the NMED upon request, as specified in 20.4.1 NMAC § 264.115. A copy of the certification and supporting documentation will be maintained by both DOE/NNSA LASO and SWRC.

F.1.7 Security

Because of the ongoing nature of waste management operations at LANL, security and administrative controls at the sites of hazardous or mixed waste management units will be maintained by the DOE/NNSA or another authorized federal agency for as long as necessary to prohibit public access. Details of security measures are included in Attachment F of TA-specific permit applications, permit modification requests, or permit renewal applications.

F.1.8 Closure Reports

Upon completion of final RCRA closure of the LANL hazardous waste management facility or partial closure of individual waste management units, a closure report will be prepared and provided to the Secretary of the NMED. The report will document the closure and contain, for example, the following:

- A copy of the certification described in Section F.1.6
- Any significant variance from the approved closure plan and the reason for the variance
- The location of the file of supporting documentation, including:
 - Closure certification reports for closed units
 - Documentation for units being closed under alternative closure requirements
 - NMED closure approvals
 - Survey plats and related field data
- A certification of accuracy of the report.

Information to be included in closure reports for waste management units is addressed in Attachment F of TA-specific permit applications, permit modification requests, or permit renewal applications.

F.1.9 Survey Plat and Post-Closure Requirements [20.4.1 NMAC §§ 264.116 and 264.117 through 264.120]

For partial closure, LANL intends to remove hazardous waste and associated constituents from the unit(s) undergoing closure, remove or conduct in-situ treatment of soil contaminated with hazardous wastes or hazardous waste residues, and decontaminate structures and equipment contained in the unit. If decontamination to the cleanup levels approved in the closure plan cannot be achieved, LANL intends to dispose of or otherwise manage the contaminated structures, equipment, soil, or other media. If decontamination to these cleanup levels is not achievable, LANL may also propose an alternate demonstration of decontamination, as circumstances indicate. A survey plat, post-closure certification, and post-closure notices will not be required for the closure of units that remove, treat in situ, or decontaminate hazardous waste or hazardous waste residues.

If a land disposal unit, tank unit, or miscellaneous unit cannot be closed by removal or decontamination of hazardous waste or hazardous waste residues, LANL will conduct post-closure or equivalent activities in accordance with Appendix G of this document. A survey plat prepared in accordance with 20.4.1 NMAC § 264.116 [6-14-00] will be filed with the appropriate authorities at certification of closure, as described in that regulation. Post-closure care pursuant to 20.4.1 NMAC §§ 264.117 through 264.120 [6-14-00] will begin after closure of the unit. Post-closure notices will be filed with appropriate authorities, as described in 20.4.1 NMAC § 264.119 [6-14-00]. To meet that requirement, DOE/NNSA will file a "Land Use Restriction Notice" or equivalent document with

the County of Los Alamos and other authorized agencies. Within 60 days after completion of the established post-closure care period for the unit, LANL will submit to the Secretary of the NMED, via certified mail, a certification of completion of post-closure care in accordance with the requirements of 20.4.1 NMAC § 264.120 [6-14-00].

F.2. CLOSURE APPROACHES BY WASTE MANAGEMENT UNIT TYPE

F.2.1 Preliminary Closure Activities

F.2.1.1 Safety Precautions

Job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted, in accordance with LANL safety procedures. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE) specified by LANL industrial safety groups, and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. All workers involved in closure activities will be required to have appropriate training (see Appendix D in this document). Contaminated PPE will either be decontaminated or managed in compliance with appropriate waste management regulations.

F.2.1.2 Background Determination

Before any decontamination activity begins, background levels for potential hazardous waste constituents will be determined. Decontamination and verification sampling procedures may involve wash water sampling, swipe sampling, soil sampling, or other methods developed before the time of closure. Background samples will be obtained from clean water, cleaning equipment, and detergent solutions if wash water methods are used for decontamination. Background samples will be obtained for the material to be decontaminated or for any sampling materials used in swipe sampling analysis used for verification purposes. Appropriate background samples and/or concentrations derived from LANL studies developed under the LANL corrective action or other programs will be used to determine hazardous constituent background/baseline levels. Details of appropriate background levels and/or necessary samples and collection techniques will be included in the unit-specific SAPs, as discussed in Section F.2.2.7 of this closure plan.

F.2.2 Storage and Treatment Units

F.2.2.1 Container Storage Units

Removal of Waste

Prior to the initiation of closure activities, wastes will be removed from the LANL container storage unit (CSU) to be closed. Containers will be removed from each unit with forklifts, cranes, hand trucks, or manually as appropriate for the size, amounts, and types of waste in the CSU. Containers will be placed onto flatbed trucks, trailers, or other vehicles appropriate for transport. Appropriate shipping papers will accompany the wastes during transport. Waste containers will be moved to an approved on-site CSU or to an off-site permitted treatment, storage, or disposal facility.

Closure Procedure and Decontamination

To the extent possible, all contaminated structures and equipment at the LANL CSUs to be closed will be decontaminated. Closure activities at LANL CSUs will generally involve the use of wash water solutions to decontaminate the waste management structure surfaces (e.g., floors, secondary containment structures, and walls). Structures and equipment that cannot or will not be decontaminated will be removed, containerized, and managed in compliance with appropriate waste management regulations. Decontamination procedures will be verified by sampling and analysis. All sampling conducted during closure activities will be done as prescribed in the CSU-specific SAP (see Section F.2.2.7). Sampling and analysis will be done in accordance with appropriate quality assurance/quality control (QA/QC) procedures as required by the individual analytical technique or the authority for the relevant standard methods (e.g., "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" [SW-846] [U.S. Environmental Protection Agency (EPA), 1986]; American Society for Testing and Materials [ASTM]). Closure will be conducted in accordance with the SAPs submitted for approval prior to the actual closures.

Structural Assessment

Before decontamination activities begin, the base or secondary containment of each CSU will be inspected for any cracks or conditions that could potentially lead to loss of wash water containment if wash water procedures will be used for decontamination. Preventive maintenance inspections are conducted routinely (i.e., weekly) at each CSU. If any defects, deterioration, damage, or hazards affecting containment have developed after the most recent preventive maintenance inspection was conducted, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) will be completed before decontamination activities begin. If a crack or gap is present, a swipe sample or a representative sample of the media will be taken (e.g., epoxy or paint coatings, asphaltic concrete, or concrete) to determine the presence of contamination. The sample will be analyzed for hazardous contaminants of potential concern (COPC) determined through review of the chemical properties of the waste stored during the operating history of the CSU and

through an evaluation of the history of any spills that may have occurred at the CSU. If contamination is detected, the surface flaw will be decontaminated prior to repairing the crack/gap. Complete or partial removal (e.g., scraping or cold-milling) of the material may be performed until contamination is no longer detected. If partial removal is successful in eliminating the contamination, it will be assumed that the remaining material, including underlying soil, is clean.

After any decontamination wash down process, the used wash water will be collected, transferred to containers, sampled, and analyzed for the appropriate parameters determined during the documentation review. If the used wash water is nonhazardous and nonradioactive, it will be managed appropriately in accordance with LANL policy. Otherwise, the used wash water will be managed at an appropriate on-site facility.

Decontamination of CSUs

LANL CSUs will be closed by removal and decontamination of hazardous waste and hazardous waste residues. Storage rooms, sheds, domes, and buildings will be closed by washing the interior storage surfaces to remove or decontaminate hazardous wastes and hazardous waste residues. The first step in decontamination will be to evaluate the CSU's operating record to determine the COPCs. The appropriate surfactant/solvent to be used in the wash water solution will be determined based upon the COPCs. General laboratory surfactants (e.g., Alconox) will be used for the majority of washes where many COPCs are being sampled for, and specialized solvents may be used for more focused removal purposes.

Based on the review of the operating record (e.g., spills) and an evaluation of structural areas of potential concern (e.g., sumps, stained areas, low areas), preliminary decontamination focused on these areas may be conducted prior to the overall decontamination of the CSU. Prior to overall decontamination of a structure, any portable equipment will be wiped down with wash water solution. The structure walls and floors will then be wiped down with mops and sponges to minimize the amount of liquid waste generated as a result of decontamination activities. A portable berm, existing berm or sump, or other device (e.g., absorbent socks, plastic sheeting, wading pools) designed to collect and provide containment for used wash water will be used, as necessary.

After the walls and floors have been decontaminated, any recessed areas present (e.g., sumps) will be wiped down with wash water. The used wash water will collect in the recessed area; it will then be removed and transferred to an appropriate container(s). The recessed area will be wiped down

again with wash water; this wash water will be minimized, collected with sponges and/or mops, and transferred to the same appropriate container(s), where it will be sampled. The container(s) of used wash water will be stored appropriately, pending analysis for decontamination verification.

In certain cases of closures at the LANL CSUs, soil removal or in-situ remediation may be conducted to meet the closure performance standards. Examples of when these activities may be performed include the detection of contamination that had migrated beyond CSU pads to the surrounding soil, and cases in which operating records indicate that a release of hazardous waste from storage structures to the surrounding soil has occurred. If records indicate that no release of hazardous waste to soils has occurred, soil sampling will not be conducted.

If collection of soil samples is determined to be necessary to demonstrate decontamination, background soil samples will be collected and analyzed to provide a baseline for decontamination verification. Sampling locations to determine the extent of contamination will be based upon a biased random sampling approach, including historical evidence of releases, physical evidence of distressed vegetation or visual staining, and any other information that indicates a potential contamination pathway. The number of samples, locations, depths, and sampling methods will be determined before closure and included in the CSU-specific closure SAP, as discussed in Section F.2.2.7. Results from sampling will be compared to the background samples and/or baseline concentration levels included in the closure SAP. If analysis shows that the soil at the storage areas is contaminated, soil sampling results that are above the background/baseline levels will be used to identify the extent of soil contamination. Contaminated soils may be removed in layers and sampling conducted following removal of each layer. This procedure will be used to minimize the amount of waste generated during closure. The removal and sampling process will be repeated until the decontamination criteria are achieved or it is decided to close the CSU as a landfill. Alternatively, the contaminated soil may be remediated in situ, with post-remediation sampling and analysis conducted to demonstrate successful decontamination.

In the event that closure of the CSU cannot be achieved, a post-closure plan will be prepared for the site, as required by 20.4.1 NMAC § 264.118. The plan will include provisions to stabilize the site and will describe planned monitoring activities, maintenance activities, and the frequencies at which these activities will be performed, as required by 20.4.1 NMAC § 264.118.

Sufficient sampling and analysis will be required to demonstrate that hazardous or mixed waste residue is not present at the CSU after closure. Wash water sampling, swipe sampling, or other appropriate sampling and analysis methodologies may be used to verify decontamination. The verification sampling method will be determined at the time of development of the CSU-specific closure SAP and will be based on factors such as COPCs and materials of construction for the storage structure. The SAP will establish the minimum number of verification samples based on the total surface area of the CSU. Using a biased random sampling approach, items, structures, and/or surfaces will be sampled for verification of decontamination. Sample bias will include known or likely areas of contamination, low areas, sumps, and known spill locations, as determined to be appropriate on a case-by-case basis.

For wash water-based decontamination verifications (e.g., asphaltic-concrete pads), the samples of clean wash water solution squeezed from mops and/or sponges prior to use will be collected as background before initial wash down of any CSU. The samples will be analyzed for the appropriate parameters, as presented in the closure SAP. Analytical procedures will conform to methods found in the most current version of *SW-846* (EPA, 1986). Used wash down solutions will be analyzed for the same parameters. Wash down solutions will be considered contaminated if the used wash water solution shows a significant increase (i.e., determined using statistical methods defined in *SW-846*) in the analytical parameters over those in the clean wash water solution. If subsequent wash downs are deemed necessary, an additional sample of clean wash water solution squeezed from mops and/or sponges prior to use will be taken for each additional wash down event.

Swipe sampling may be used on a case-by-case basis (e.g., for smooth or impervious surfaces such as metal and dome fabric) to determine verification of decontamination at the CSUs. Background for swipe samples will be determined by submitting an unused swipe and solvent sample for analysis. Swipe samples will be analyzed using approved methods, which will be included in the closure SAP. The rationale for when swipe sampling will be conducted will also be included in the SAP.

If other sampling methodologies have been developed at the time of closure for a CSU, their use to determine decontamination will be addressed in the closure SAP.

For any sampling methodology, decontamination will be verified if the collected samples meet any of the decontamination criteria listed in Section F.2.2.6 of this closure plan. If the verification

sampling indicates contamination higher than the approved values, additional sampling will be performed to establish the boundaries of contamination for large structures. After establishing the boundaries of contamination, the decontamination process may be repeated within those boundaries, using portable berms or other appropriate material to limit the potential for run-off from the affected area. An additional round of verification sampling will be performed for all of the areas previously determined to be contaminated. After each decontamination event and verification iteration, a decision will be made to repeat the process or remove contaminated materials and dispose of them properly.

F.2.2.2 Tank Storage Units

Tank storage units will be closed by removal and/or decontamination of hazardous waste or hazardous waste residues. All contaminated surfaces and equipment associated with storage tank systems will be decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. Tank system components will be decommissioned at closure and either decontaminated or containerized and managed in compliance with appropriate regulations. Tank system ancillary equipment (e.g., piping, pumps) will be managed in the same manner.

If a tank system or its ancillary equipment is decontaminated, the following procedure will be used. The interior surfaces of the tank system components or ancillary equipment will be flushed with wash water. Following the wash down, the water will be collected and analyzed for COPCs. The exterior surfaces will be wiped down with a wash water solution using cloths and/or other absorbent material to minimize the amount of liquid waste generated as a result of the decontamination activities. The wash water will be collected and analyzed for the applicable COPCs. Used wash water will be managed in accordance with applicable regulations. The wash cycles will continue until the equipment has been cleaned to established levels or the decision is made to manage it as waste.

Random swipe samples will be taken from the areas adjacent to the storage tank system (e.g., walls, floors, sumps, and drains) and will be analyzed for the applicable COPCs. If decontamination is determined to be needed based upon the levels of contaminants determined by swipe sampling, the surfaces will be washed down using procedures to minimize dilution by limiting the amount of wash solution used. The wash solution will be collected and analyzed for the applicable COPCs. Wash cycles will continue until the surfaces have been cleaned to established levels.

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Decontamination verification will be determined through this process. Used wash water will be managed in accordance with applicable regulations.

F.2.2.3 Cementation Treatment Units

Cementation units will be closed by removal and decontamination of hazardous waste and hazardous waste residues. Treatment by cementation at LANL occurs in containers. The cementation unit equipment and associated ancillary equipment will be decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. If any of the cementation unit equipment is to be decommissioned or dismantled, the resulting components will be containerized and managed appropriately at an approved on-site facility, depending on the regulated constituents present.

Prior to decontamination, any visible material located within the unit will be removed and managed as waste. The cementation unit will be rinsed and washed down with specified procedures for minimizing dilution by limiting the amount of wash water solution used. The used wash water will be collected and analyzed for appropriate COPCs to verify decontamination. Successive rinse cycles will be performed until decontamination levels are achieved or the decision is made to dispose of the equipment as waste. Equipment to be disposed as waste will be containerized and managed in compliance with appropriate regulations.

Random swipe samples will be taken from the areas adjacent to the cementation unit and analyzed for the COPCs determined for the unit-specific closure. If decontamination measures are determined to be necessary to achieve closure standards, wash and analysis cycles will be performed until decontamination to established levels is verified.

F.2.2.4 Open Burning Treatment Units

Open burning (OB) units will be closed by removal and decontamination of hazardous waste and hazardous waste residues to the extent possible. LANL OB units are permitted under 20.4.1 NMAC, Subpart V, Part 264, Subpart X standards. If decontamination procedures for OB units are not effective, the unit will be subject to post-closure care requirements as required by 20.4.1 NMAC § 264.603.

The OB unit will receive a thorough visual inspection for unburned materials, which, if found, will be treated and managed appropriately. To the extent possible, contaminated OB structures will be decontaminated. Any equipment associated with the OB unit will be removed, decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. If any of the unit equipment is to be decommissioned or

dismantled, the resulting components will be managed appropriately at an approved facility, depending on the regulated constituents present. Other closure activities will include the removal, treatment, segregation, and/or disposition of OB structures and related equipment, and soil sampling and removal as determined to be necessary.

Soil sampling, if determined to be necessary, will be performed and analyses conducted for the identified COPCs to determine the existence or extent of OB-related contaminants. Based upon the results of this sampling, excavation of surrounding soils may be required. Any soil removed will be properly characterized and disposed of.

If decontamination of the surrounding soil cannot be reasonably achieved, LANL may propose alternative decontamination demonstrations for approval by NMED, or request that the unit be closed and further managed under post-closure requirements. In that event, a post-closure care plan will be developed for further management of the unit. If the OB unit being closed is situated in close proximity with SWMUs, releases have been determined to be present, and the origin of the releases is not distinguished, and if the characterization and potential remediation of the SWMUs is being managed under the LANL corrective action program, LANL will request that the unit be considered for alternative requirements for post-closure care, as allowed by 20.4.1 NMAC § 264.110(c).

F.2.2.5 Open Detonation Treatment Units

Open detonation (OD) units will be closed by removal and decontamination of hazardous waste and hazardous waste residues to the extent possible. LANL OD units are permitted under 20.4.1 NMAC, Subpart V, Part 264, Subpart X standards. If decontamination procedures for OD units are not effective, the unit will be subject to post-closure care requirements as required by 20.4.1 NMAC § 264.603.

To the extent possible, contaminated OD structures will be decontaminated. Any equipment associated with the OD unit will be decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. If any of the unit equipment is to be decommissioned or dismantled, the resulting components will be managed appropriately at an approved facility, depending on the regulated constituents present. Other closure activities will include the removal, treatment, segregation, and/or disposition of OD structures and related equipment, and soil sampling and removal as determined to be necessary.

The OD structure will receive a thorough visual inspection for untreated materials, which, if found, will be treated and managed appropriately. Any equipment associated with the OD unit will be removed, decontaminated, and disposed of in accordance with applicable regulations. Soil sampling for identified COPCs will be performed to determine the existence or extent of OD-related contaminants. Based upon the results of this sampling, excavation of surrounding soils will be performed and the soils collected for appropriate disposition, if contaminated. As layers or areas of soil are removed, additional soil sampling will subsequently be performed until the decontamination process is verified.

If decontamination of the surrounding soil cannot be reasonably achieved, LANL may propose alternative decontamination demonstrations for approval by NMED, or request that the unit be closed and further managed under post-closure requirements. In that event, a post-closure care plan will be developed for further management of the unit. If the OD unit being closed is situated in close proximity with SWMUs, releases have been determined to be present, and the origin of the releases is not distinguished, and if the characterization and potential remediation of the SWMUs is being managed under the LANL corrective action program, LANL will request that the unit be considered for alternative requirements for post-closure care, as allowed by 20.4.1 NMAC § 264.110(c).

F.2.2.6 Decontamination Criteria

Successful decontamination for LANL hazardous waste management units is defined as one of the following criteria:

- No detectable hazardous waste or hazardous waste constituents from hazardous waste management unit activities are found in the final sample.
- Detectable hazardous waste or hazardous waste constituents from hazardous waste management unit activities in the final sample are removed to statistically significant levels based on baseline concentrations in the clean wash water.
- Detectable hazardous waste or hazardous waste constituents from hazardous waste management unit activities in the final sample are at or below levels agreed upon with the NMED.
- Detectable hazardous waste or hazardous waste constituent concentrations from hazardous waste management unit activities do not significantly decrease after several wash downs. In such an event, hazardous constituents that pose an acceptable risk will be allowed to remain, as mutually agreed upon with the NMED.

An alternative demonstration of decontamination may be proposed and justified at the time of unit closure, as circumstances indicate. The Secretary of the NMED will evaluate the proposed alternative in accordance with the standards and guidance then in effect and, if approved, incorporate the alternative into the closure plan.

F.2.2.7 Sampling and Analytical Procedures

Sampling and analytical procedures will be performed during the decontamination and verification activities associated with the partial closure of the hazardous waste management units. These procedures will use standard approved methods (e.g., *SW-846*, ASTM) as appropriate for making closure decontamination verification determinations. However, the units may not be closed for relatively lengthy periods of time and it is probable that sampling and analytical methods will be revised and improved before closure. In order to alleviate the need for future closure plan and permit modifications until actual closure activities are finalized, LANL will submit unit-specific closure SAPs at the time of closure notification to NMED for review and approval.

The closure SAP will contain a detailed discussion of the available hazardous waste management unit information and proposed closure methodology to assure the closure standards are met. These include:

- A detailed discussion of site characteristics.
- The hazardous waste management unit operational history, to include descriptions of known spills, releases, and/or evidence of potential problems (e.g., visual stains, dead vegetation, SWMUs).
- Chemical properties of the waste managed at the hazardous waste management unit.
- Determination of applicable COPCs.
- A hazard control plan, including a review of chemical hazards present at the site, control and monitoring methods and procedures, and required PPE.
- Determination of wash water solution composition, if necessary.
- Detailed procedures for decontamination methods for equipment, structures, and media.
- Discussion of background levels determined through sampling or use of published data and their relevance to the specific hazardous waste management unit.
- Methods for sampling and analysis of contaminated media.

- Removal procedures for contaminated media, if necessary.
- Sampling methods for decontamination media and hazardous waste determination. The discussion should include the rationale for using wash water samples, swipe samples, soil samples, and/or other sampling methodology.
- Sampling methods for decontamination verification procedures. The discussion should include the statistical or judgmental basis for determining the number of verification samples needed and the constituents to be analyzed for.
- Sampling equipment decontamination and disposition procedures.
- Sample handling and documentation procedures.
- Analytical methods (including detection limits) and the rationale for their determination.
- Disposition of removed waste, decontamination media, or contaminated soils. This discussion should include an identification of proposed on- or off-site hazardous waste management facilities that may be used for final disposition and the types of wastes anticipated to be shipped.
- Decontamination criteria.
- Statistical basis for verification of decontamination, if applicable. The discussion should include information on determination of statistical increases in analytical parameters and numerical values for significant increases.
- Risk assessment procedures to be used, if necessary.
- Field and laboratory QA/QC procedures.
- Schedule of closure activities, including decontamination, sampling, analysis, potential removal of soils, and closure certification submittal.
- Identification of contact person or office.

F.2.3 Land Disposal Units

Land disposal units, tank units, and miscellaneous units that cannot be closed by removal or decontamination of hazardous waste or hazardous waste residues will be managed under post-closure care requirements contained in 20.4.1 NMAC, Subpart V, Part 264, Subpart G. In the case of land disposal units and tanks or miscellaneous units that are co-located with SWMUs and that cannot be closed by removal or decontamination of hazardous waste and hazardous waste residues, partial closure will be accomplished by stabilizing, as necessary, the wastes and/or waste residues that remain in place and requesting NMED approval to address such units under

alternative requirements, as allowed by 20.4.1 NMAC § 264.110(c), to meet post-closure care requirements.

Post-closure care plans will be prepared for any hazardous waste management unit meeting the conditions discussed above. The post-closure plan will address applicable post-closure requirements specified in 20.4.1 NMAC, Subpart V, Part 264, Subparts G and H. These requirements will include provisions for maintenance and monitoring of the unit during the post-closure care period as set forth in 20.4.1 NMAC § 264.118. General requirements for LANL post-closure plans are discussed in Appendix G of this permit renewal application. Detailed requirements for specific LANL land disposal units will be included in TA-specific permit applications, permit modification requests, or permit renewal applications.

F.3 REFERENCES

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-SW-846, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.